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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/656,777	09/07/2000	Junji Kuyama	09793822-0409	1570

26263 7590 07/15/2003

SONNENSCHN NATH & ROSENTHAL
P.O. BOX 061080
WACKER DRIVE STATION
CHICAGO, IL 60606-1080

EXAMINER

WILLS, MONIQUE M

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 07/15/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/656,777

Applicant(s)

KUYAMA ET AL

Examiner

Wills M Monique

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1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 April 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10 and 12-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10 and 12-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

This Office Action is responsive to the amendment filed May 8, 2003. The rejection of claims 10-12 & 17-22 under 35 U.S.C. 103(a) as being unpatentable over Miyasaka U.S. Patent 5,869,208 , and further in view Sugeno et al. U.S. Patent 6,083,646, is overcome. The rejection of claims 13-16 under 35 U.S.C. 103(a) as being unpatentable over Sugeno et al. U.S. Patent 6,083,646 and further in view of Kubo et al. U.S. Patent 5,773,168, is overcome. However, the rejection of claims 10-12 & 17-22 under 35 U.S.C. 103(a) as being unpatentable over Miyasaka U.S. Patent 5,869,208 and further in view of Tanno U.S. Patent 5,853,918, is maintained. Claims 13-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Miyasaka U.S. Patent 5,869,208.

Claim Objections

Claim 12 is objected to because of the following informalities: said claim depends upon itself. Appropriate correction is required. The claim will be examined as if it depends on claim 10.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 17-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miyasaka U.S. Patent 5,869,208 and further in view of Tanno U.S. Patent 5,853,918.

Miyasaka teaches a lithium ion secondary battery having a positive electrode, negative electrode, a non-aqueous electrolyte, and a container; the positive electrode is made of a positive electrode active material having a spinel structure and the formula:



wherein M is cation of a metal other than Li and Mn; x, a and b are $0.1 < x \leq 1.2$, $0 \leq a < 2.0$ (preferably $0 < a < 2.0$), $1 \leq c \leq 3$, and $0 \leq b < 0.3$, during its charge-discharge cycle (see abstract). The positive electrode active material (or its precursor) and the negative electrode active material (or its precursor) preferably are in the form of particles having a mean diameter of 0.03 to 50 μ , more preferably 0.1 to 20 μ . See column 8, lines 20-25. The positive electrode active material or its precursor preferably has a specific surface area of 1 to 10 m^2/g . See column 8, lines 25-31. The specific surface area is measured using the BET method (col. 11, lines 10-

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15). The electrolyte solution comprises a non-protonic organic solvent and a lithium salt (namely, electrolyte) soluble in the solvent. Examples of the organic solvents include propylene carbonate, ethylene carbonate, butylene carbonate, dimethyl carbonate, diethyl carbonate, gamma-butyrolactone, 1,2-dimethoxyethane, tetrahydrofuran, 2-methyltetrahydrofuran, dimethyl sulfoxide, 1,3-dioxolane, formamide, dimethyl formamide, dioxolane, acetonitrile, nitromethane, methyl formate, methyl acetate, phosphoric triester, trimethoxymethane, dioxolane derivatives, sulforane, 3-methyl-2-oxazolidinone, propylene carbonate derivatives, tetrahydrofuran derivatives, diethyl ether, and 1,3-propane sultone. These solvents can be employed singly or in combination. Examples of the lithium salts include LiClO_4 , LiBF_6 , LiPF_6 , LiCF_3SO_3 , LiCF_3CO_2 , LiASF_6 , LiSbF_6 , $\text{LiB}_{10}\text{Cl}_{10}$, lithium salts of lower aliphatic carboxylic acids, LiAlCl_4 , LiCl , LiBr , LiI , chloroborane lithium, and lithium tetraphenylborate. These lithium salts can be employed singly or in combination. See column 9, lines 1-30. The reference also teaches that polyfluorinated vinylidene can be employed in the positive electrode in the amount of 2 to 30% (col. 8, lines 30-45). Graphite may be employed in the cathodic material in the range of 2 to 15% col.8, lines 15-20).

The reference is silent to a carbonaceous anode selected from the group consisting of pyrocarbon, coke, glassy carbon, organic polymer compound sintered body and carbon fiber.

However, Tanno teaches that carbonaceous materials and graphite are equivalent to metallic lithium and lithium alloy materials for negative electrodes in

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secondary lithium cells (col. 1, lines 25-30). The reference also teaches that employing carbonaceous materials such as coke reduces capacity loss in the initial stage of charge and discharge cycles (col.1 , lines 50-55 and col.3, lines 20-25).

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made to employ the carbonaceous materials of Tanno in place of the lithium anode of Miyasaka because, in order to reduce capacity loss in the initial stage of charge and discharge cycles of the cell.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

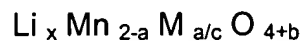
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 10 and 12-16 are rejected under 35 U.S.C. 102(b) as being anticipated by Miyasaka U.S. Patent 5,869,208.

Miyasaka teaches mixing a first ingredient of sulfates and water with a lithium composite manganese oxide of 87%wt, (col. 11, lines 10-20 and Col. 12, lines 5-10), molding the mixture into a compressed sheet having a thickness of 10 to 500µm (col. 10, lines 15-20), sintering the mixture at 600°C for 4 hours and at 750°C for 24 hours and pulverizing the mixture to obtain particles of 8 to 20µms (col. 11, lines 10-27). The

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resulting active material was mixed with 2 to 15% graphite (col. 8, lines 15-20), and 2 to 20% of polyvinylidene fluoride (col. 8, lines 35-43) and coated on an aluminum foil (col. 12, lines 10-15) to obtain a thickness of 10 to 500 μm (col. 10, lines 15-20). The resulting cathodic material is represented by the formula:



wherein M is cation of a metal other than Li and Mn; x, a and b are

$0.1 < x \leq 1.2$, $0 \leq a < 2.0$ (preferably $0 < a < 2.0$), $1 \leq c \leq 3$, and $0 \leq b < 0.3$, during its charge-discharge cycle (see abstract). The positive electrode active material (or its precursor) and the negative electrode active material (or its precursor) preferably are in the form of particles having a mean diameter of 0.03 to 50 μm , more preferably 0.1 to 20 μm . See column 8, lines 20-25. The positive electrode active material or its precursor preferably has a specific surface area of 1 to 10 m^2/g . See column 8, lines 25-31. The specific surface area is measured using the BET method (col. 11, lines 10-15). The anodic material consists of lithium alloys that lithium ions can be intercalated into (col. 5, lines 65-68 and col. 6, lines 1-10).

Response to Arguments

Applicant contends that Sugeno cannot be used because it is 102(e) art and has the same assignment as the subject invention. This assertion is correct and therefore, claims rejected in view of Sugeno are overcome.

Regarding the Miyasaka reference, the application asserts that the maximum atomic rate of M in the formula LiMnMO is less than or equal to 0.3, and the reference teaches a much broader range. This argument is not persuasive. The stoichiometric value of M is less than 0.66, but is exemplified as much smaller values including 0.02, 0.03, 0.05, 0.1 in Table 1 (column 5, lines 35-65). The Applicant also contends that the particle sizes of the reference are up to 5 times as large as those of the subject invention. This argument is not persuasive. The reference exemplifies a primary particle size of $0.5\mu\text{m}$ (col. 11, lines 20-30).

Conclusions

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (703) 305-0073. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

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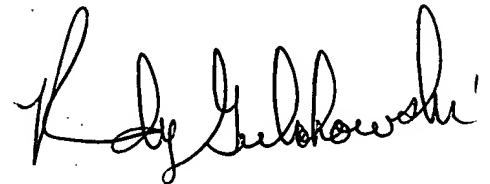
Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Patrick Ryan, may be reached at 703-308-2383.

The unofficial fax number is (703) 305-3599. The Official fax number for non-final amendments is 703-872-9310. The Official fax number for after final amendments is 703-872-9311.

Mw

07/08/03

A handwritten signature in black ink, appearing to read 'Randy Gulakowski', is written over a rectangular stamp area.

RANDY GULAKOWSKI
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700